SLOVENSKI STANDARD
SIST EN 539-2:2013

01-julij-2013

Nadomešča:
SIST EN 539-2:2006
SIST EN 539-2:2006/AC:2009

Opečni strešniki - Ugotavljanje fizikalnih lastnosti - 2. del: Preskušanje odpornosti proti zamrzovanju

Clay roofing tiles for discontinuous laying - Determination of physical characteristics - Part 2: Test for frost resistance

Dachziegel für überdeckende Verlegung - Bestimmung der physikalischen Merkmale - Teil 2: Prüfung der Frostwiderstandsfähigkeit

Tuiles de terre cuite pour pose en discontinu - Détermination des caractéristiques physiques - Partie 2 : Essais de résistance au gel

Ta slovenski standard je istoveten z: **EN 539-2:2013**

ICS:

91.060.20	Strehe	Roofs
91.100.25	Keramični gradbeni izdelki	Ceramic building products

SIST EN 539-2:2013 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 539-2

May 2013

ICS 91.100.25

Supersedes EN 539-2:2006

English Version

Clay roofing tiles for discontinuous laying - Determination of physical characteristics - Part 2: Test for frost resistance

Tuiles de terre cuite pour pose en discontinu - Détermination des caractéristiques physiques - Partie 2: Essais de résistance au gel

Dachziegel für überdeckende Verlegung - Bestimmung der physikalischen Eigenschaften - Teil 2: Prüfung der Frostwiderstandsfähigkeit

This European Standard was approved by CEN on 14 March 2013.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Ref. No. EN 539-2:2013: E

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Foreword

This document (EN 539-2:2013) has been prepared by Technical Committee CEN/TC 128 “Roof covering products for discontinuous laying and products for wall cladding”, the secretariat of which is held by IBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2013, and conflicting national standards shall be withdrawn at the latest by November 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 539-2:2006.

In comparison to the previous edition, modifications have been made in Clause 1, subclauses 3.1, 3.5, 3.6 and 3.8, Clause 5 and Annex A. The test methods A, B, C and D are withdrawn.

This part of EN 539 is preceded by:

— EN 539-1, *Clay roofing tiles for discontinuous laying — Determination of physical characteristics — Part 1: Impermeability test*

This part of EN 539 is one of a series of standards concerning clay roofing tiles, the list of which is indicated below:

— EN 1304, *Clay roofing tiles and fittings — Products definitions and specifications*

— EN 538, *Clay roofing tiles for discontinuous laying — Flexural strength test*

— EN 1024, *Clay roofing tiles for discontinuous laying — Determination of geometric characteristics*

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies the test method for the determination of frost resistance of clay roofing tiles and fittings.

The test method is applicable in all CEN member countries in accordance with the required performance level of each member state.

2 Normative references

Not applicable.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
pit
superficial fault consisting of a fraction of material detached from the body of the product on the visible surface of the product with a mean dimension of over 7 mm

Note 1 to entry: This is often due to the expansion of a particle of, for example, chalk or pyrites.

[SOURCE: EN 1304:2013, 3.5.18.2]

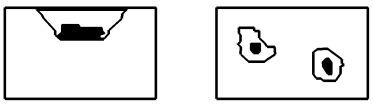


Figure 1 — Example of pit

3.2
hair crack
superficial crack having a width of not more than 0,20 mm

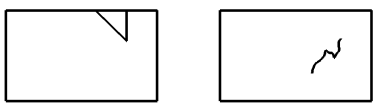


Figure 2 — Example of hair crack

3.3
nascent crack
crack formation at the edge, with the crack only penetrating slightly into the interior of the ceramic body

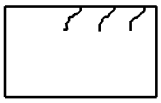


Figure 3 — Example of nascent crack

3.4
surface crack
crack more than 0,20 mm wide and with a length of more than 30 mm, which does not pass through the thickness of the product

Figure 4 — Example of surface crack

3.5
surface damage
loss of a part of the ceramic body material from the surface of the product with the longest dimension greater than 15 mm together with the widest dimension perpendicular to the length greater than 5 mm

3.5.1
scaling
surface raising, nascent chipping, or crack, which initiates damage

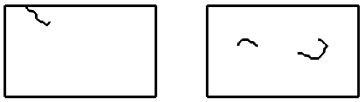


Figure 5 — Example of scaling

3.5.2
chip
loss of a fraction of the body material of the product

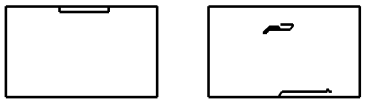


Figure 6 — Example of chip

3.5.3
peeling
loss of a part of the superficial layer of the product

Figure 7 — Example of peeling

3.5.4
flaking
progressive loss of body material affecting parts or the whole thickness of the product

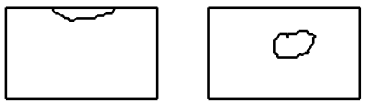


Figure 8 — Example of flaking

3.6
structural crack
structural fault consisting of a more or less regular crack running throughout the entire thickness of the product and visible to the naked eye

[SOURCE: EN 1304:2013, 3.5.17.2]

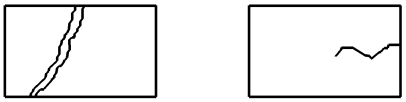


Figure 9 — Example of structural crack

3.7
loss of ribs
loss of body material from the interlocking ribs sufficient to influence their function

Figure 10 — Example of loss of ribs

3.8
break
structural fault consisting of a separation of the product into two or more fragments

[SOURCE: EN 1304:2013, 3.5.17.1]

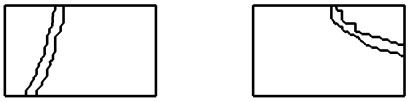


Figure 11 — Example of break

3.9
delamination
lamellar flaking which can lead to the delamination of the body in a succession of parallel layers

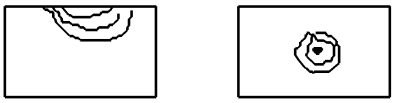


Figure 12 — Example of delamination

3.10
calibration device
roof tile or ceramic slab which may be specially made to possess the characteristics defined within 5.4.1.1 and which will not be damaged during the calibration

4 Test pieces

If the tiles or fittings are placed on the market with a ceramic coating and/or treatment, the tests shall be carried out on test pieces which have this same coating and/or treatment.

When the tiles or fittings are taken from a site or building, they shall be tested in the state in which they are found, but the interpretation of the test results shall take into account the stresses to which these installed products have been subjected.

5 Test method (European single test method)

5.1 Principle

Test pieces are progressively immersed in water for a period of seven days, then covered on their back with a damp cloth, and then placed in a freezing chamber where they are subjected to freeze/thaw cycles.

During these cycles, the products are frozen by air and thawed by water on all of their surfaces at the same time.

The damage that occurs during the test is recorded.

The number of cycles of each level is specified in this European Standard.

5.2 Apparatus

5.2.1 Freeze/thaw unit

The freeze/thaw unit shall consist of a freezing chamber, fan, cooling units, water level regulator, water drain and programme control unit. The freeze/thaw unit shall be closed on all sides. An example is given in Figure 13. The freeze/thaw unit shall be provided with a rack to hold the test pieces as specified in 5.4.2.5.

Temperature sensor(s) shall be fitted inside the freezing chamber to permit monitoring of the temperature distribution inside the chamber. The temperature sensor(s), e.g. measurement thermocouples or resistance

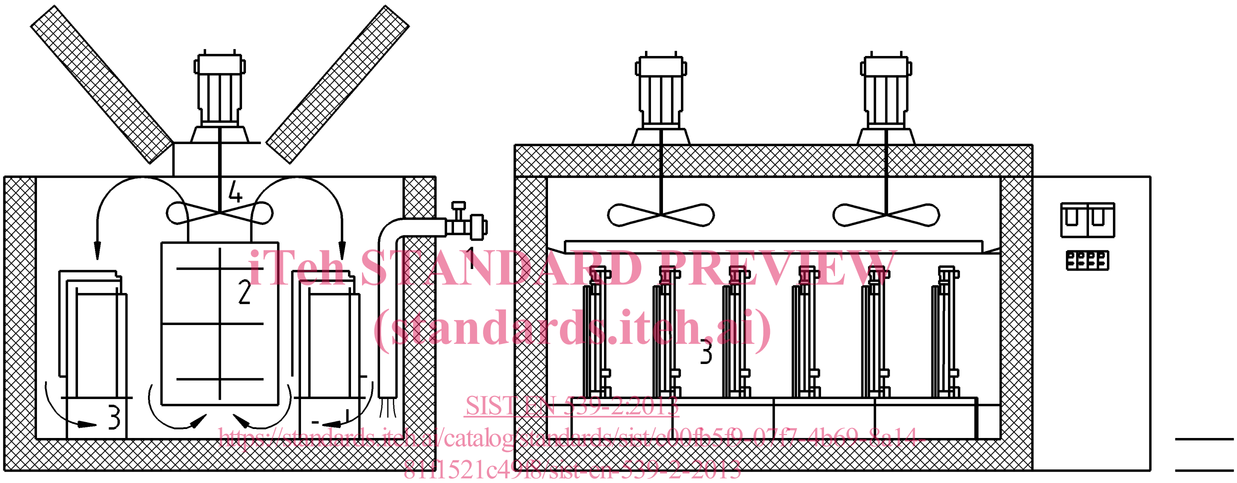
thermometers and suitable recording instruments, shall have an error limit of ± 0,5 K. Tolerances are given by taking into account the uncertainty of the recording instruments.

If necessary, deflectors should be fitted to maintain a uniform temperature distribution.

It shall be possible to regulate the cooling capacity of the unit (see 5.2.2) to ensure that the cooling and ice formation rates as measured in a calibration tile are in accordance with the freeze/thaw curve given in Figure 14.

A water feed shall be provided to ensure that both surfaces of the tile are uniformly flooded by water. The water temperature shall be (11 ± 6) °C.

In order to achieve a steady and reproducible sequence of the freeze/thaw cycles, the freeze/thaw unit shall be equipped with a programme control unit to allow the cooling and the thawing processes to be carried out in the required time.



Key

1 water input
2 heat exchanger
3 roofing tile fixing
4 circulating fan

Figure 13 — Example of freeze/thaw unit

5.2.2 Regulation of the cooling capacity of the freeze/thaw unit

5.2.2.1 Methods of control

The method of regulating the cooling capacity of the freeze/thaw unit depends on whether or not the freeze/thaw unit has a fixed cooling capacity or a variable cooling capacity. The methods to be adopted for each of these two options are described in 5.2.2.2 and 5.2.2.3.

5.2.2.2 Freeze/thaw units with fixed cooling capacity

The cooling capacity of the unit is fixed or held constant and the mass and water content of the test pieces that is required to meet the freeze/thaw curve is established by test. Thereafter the freeze/thaw unit shall be loaded with a constant mass of tiles and water content to ensure that the freeze/thaw curve is achieved.